DAFTAR PUSTAKA

Abdalla, M.S., O.A. Seoudi, A.A. Salem, and E.A.I. Hasan. 2016. Isolation, Screening and Production Extracellular Protease From Thermophilic Bacteria. *Egyptian Journal of Applied Science*. Vol 31 (2): 1-16.

Agustien, A. 2010. Isolasi, Optimasi dan Amobilisasi *Brevibacillus agri* A-03 dari Sumber Air Panas Sumatera Barat Penghasil Protease Alkali dan Keratinase Termostabil Serta Aplikasinya. *Disertasi*. Universitas Padjadjaran. Bandung.

Akanbi, T. O., AL. Kamaruzaman, F. Abu Bakar, S.A Sheikh Abdul Hamid, N., S. Radu, M.Y. Abdul Manap, and N. Saari. (2010). Highly Thermostable Extracelluler Lipase Productcing *Bacillus* Starin Isolated Froma Malaysian Hot spring and Identifiedusing16S rRNA gene sequencing. *International Food Reserch Journal*. Vol 17,45-53.

Alain K., A. Postec, E. Grinsard, F. Lesongeur, D. Prieur, and A. Godfroy. 2010. *Thermodesulfatator atlanticus sp.* nov., a thermophilic, chemolithoautotrophic sulfate-reducing bacterium isolated from a Mid-Atlantic Ridge hydrothermal vent. *International Journal of Systematic and Evolutionary Microbiology*. Vol 60: 33-38.

Andryukov, B.G., A.A Karpenko, I.N. Lyapun, E.V. Matosova, and M.P. Bynina. 2019. Bacterial Spores: Mechanisms of Stability and Targets for Modern Biotechnologies. *Biomedical Journal of Scientific and Technical Research*. Vol 20 (5): 15329-15344.

Arzita, Syamsuardi, A. Agustien, and Y. Rilda. 2017. The Diversity of the Alkaline Protease Producers, Thermophilic Obligate *Bacillus* spp., from Sungai Tutung Hot Spring, Kerinci, Jambi, Indonesia. *Journal of Pure and Applied Microbiology*. Vol 11 (4): 1789-1797.

Azlina, I.N., and Y. Norazila. 2013. Thermostable Alkaline Serine Protease from Thermophilic *Bacillus* Species. *International Research Journal of Biological Sciences*. Vol 2 (2): 29-33.

Baharuddin, A.S., M.N.A Razak, L.S. Hock, M.N. Ahmad, S.A. Aziz, N.A.A. Rahman, and U.K.M. Shah. 2010. Isolation and Characterization of Thermophilic Cellulase Producing Bacteria from Empty Fruit Bunches-Palm Oil Mill Effluent Compost. *American Journal of Applied Sciences*. Vol 7 (1): 56-62.

BBC Research. 2018. Global Markets for Enzymes in Industrial Applications. BCC Research Report Overview. p 1-13.

Brown, L. J.M. Wolf, R.P. Rosales, A. Casadevall. 2015. Through the wall: extracellular vesicles in Gram-positive bacteria, mycobacteria and fungi. *Nat Rev Microbiol*. Vol 13 (10): 620-630.

Canganella, F., and J. Wiegel. 2014. Anaerobic Thermophiles. *Life Journal*. Vol 4 (1):77–104.

Cappucino, J. G., and N. Sherman. 2013. *Microbiology A Laboratory Manual Tenth edition*. Pearson Education. San Fransisco.

Cappucino, J. G., and C. Wels. 2017. *Microbiology A Laboratory Manual Eleventh edition*. Pearson Education. United State.

Chen, G. Q., and X.R. Jiang. 2018. Next Generation Industrial Biotechnology Based on Extremophilic Bacteria. *Current Opinion in Biotechnology*. Vol 50: 94–100.

Dirnawan, H., A. Suwanto, dan T. Purwadaria. 2000. Eksplorasi Bakteri Penghasil Enzim Hidrolitik Ekstraselluler dari Sumber Air Panas Gunung Pancar. *Hayati*. Vol 7: 52-55.

El-Gayar, K.E., M.A. Al Abboud, and A.M.M. Essa. 2017. Characterization of Thermophilic Bacteria Isolated from two Hot Springs in Jazan, Saudi Arabia. *Journal Of Pure And Applied Microbiology*. Vol 11 (2): 1-9.

Fitri, L. K.A. Putri, Suhartono, and Y.S. Ismail. 2019. Isolation and characterization of thermophilic actinobacteria as proteolytic enzyme producer from Ie Seuum Hot Spring, Aceh Besar, Indonesia. *Biodiversitas*. Vol 20 (10): 2802-2808.

Ghumro, P.B. M. Shafique, M.I. Ali, I. Javed, B. Ahmad, A. Jamal, N. Ali, A. Hameed. 2011. Isolation and screening of protease producing thermophilic *Bacillus* strains from different soil types of Pakistan. *African Journal of Microbiology Research*. Vol 5 (31): 5534-5539.

Ginting, E.L. K.Kemer, S. Wullur, and A.R. Uria. 2019. Identification of Proteolytic Thermophiles From Moinit Coastal Hot-Spring, North Sulawesi, Indonesia. *Geomicrobiology Journal*. p. 1-9.

Gomes, J., and W. Steiner. 2004. The Biocatalytic Potential of Extremophiles and Extremozymes. *Food Technol. Biotechnol*. Vol 42 (4): 223-235.

Gomri, M.A., A.R. Diaz, J.J.E. Rodriguez, T.E.M., Khaldi, M.I.G. Siso, and K. Kharroub. 2018. Production and Characterization of an Extracellular Acid Protease from Thermophilic *Brevibacillus* sp. OA30 Isolated from an Algerian Hot Spring. *Microorganisms*. Vol 6 (31): 1-16.

Grahame, D. A. S., B.C. Bryksa, and R.Y. Yada. 2015. Factors affecting enzyme activity. *Improving and Tailoring Enzymes for Food Quality and Functionality*. P 11-55. https://doi.org/10.1016/B978-1-78242-285-3.00002-8.

Gupta, G., S. Srivastava, S. K. Khare, and V. Prakash. 2014. Extremophiles: An Overview Of Microorganism From Extreme Environment. *International Journal of Agriculture, Environment and Biotechnology*. Vol. 7(2): 371–380.

Gupta, R., N. Gupta, P. Rathi. 2004. Bacterial lipases: an overview of production, purification, and biochemical properties. *Appl Microbiol Biotechnol*, 64: 763-781.

Ha, D.G., S.L Kuchma, G.A. O'Toole. 2014. Plate-based assay for swimming motility in *Pseudomonas aeruginosa*. *Pseudomonas methods and protocols*. Humana Press. New York.

Haddar, A., N. Fakhfakh-Zouari, N. Hmidet, F. Frikha, M. Nasri, and A.S. Kamoun. 2010. Low-cost fermentation medium for alkaline protease production by *Bacillus mojavensis* A21 using hulled grain of wheat and sardinella peptone. *Jornal of Sciense and Bioengineering*. Vol 110 (3): 288–294.

Hamza, T.A. 2017. Bacterial Protease Enzyme: Safe and Good Alternative for Industrial and Commercial Use. *International Journal of Chemical and Biomolecular Science*. Vol 3 (1): 1-10.

Harish, R. And B.J. Chauhan. 2017. Isolation, characterization of protease producing microbes from soil of agriculture land and purification of protease. *International Journal of pharma Research and Health Sciences*. Vol 5 (1):1581- 1585.

Hreggvidsson G.O., S.K. Petursdottir, S.H. Bjornsdottir, and O.H. Fridjonsson. 2012. Microbial Speciation in the Geothermal Ecosystem. In: Stan H. And Fendrihan, L.S., Eds. *Adaption of Microbial Life to Environmental Extremes*: Novel Research Results and Application. Wien, Springer. p. 37-68.

Huang, G., T. Ying, R. Huo, and J. Jiang. 2006. Purification and Characterization of Potease from Thermophilic Bacillus Strain HS08. *African Journal of Biotechnology*. Vol 5: 2433–2438.

Jensen., D.B., T.C. Westh, P.F. Hallin, A.G. Pedersen, and D.W. Ussery. 2012. Bayesian prediction of bacterial growth temperature range based on genome sequences. *BMC Genomics* 13(suppl 7): S3.

Jisha, V.N, R.B. Smitha, S. Pradeep, S. Sreedevi, K.N. Unni, S. Sajith, P. Priji, M.S. Josh, and S. Benjamin. 2013. Versatility of microbial proteases. *Advances in Enzyme Research*. Vol 1 (3): 39-51.

Kuddus, M. and P.W. Ramteke. 2008. A Cold-Active Extracelullar Metalloprotease from *Curtobacterium luteum* (MTCC 7529): Enzyme Production and Characterization. *Journal of General and Applied Microbiology*. Vol 54: 385 392.

Kumar, S. And R. Nussinov. 2001. How do Thermophilic Protein deals with heat A review. *Cell molecular life science*. Vol 58: 1216-1233.

Kumar, V., S. Dharmendra, P. Sangwan, and P.K. Gill. 2014. Industrial enzymes trends: scope and relevance. 1st ed. Chapter: 10. In: V. Beniwal, A.K. Sharma editors. Global market scenario of industrial enzymes. India: *Nova Science Publishers*: p.173–196.

Kurniawan, H.M. 2011. Isolasi dan Optimasi Ekstrinsik Bakteri Termo-proteolitik Isolat Sumber Air Panas Semurup Kabupaten Kerinci, Jambi. *Tidak dipublikasikan*. Pasca Sarjana Universitas Andalas. Padang

Kuwabara, T., A. Kawasaki, I. Uda, A. Sugai. 2011. *Thermosipho globiformans* sp. nov., an anaerobic thermophilic bacterium that transforms into multicellular spheroids with a defect in peptidoglycan formation. *Journal of Systematic and Evolutionary Microbiology*. Vol 61: 1622–1627.

Kocher, G.S., and S. Mishra 2009. Immobilization of *Bacillus circulans* MTCC 7906 for enhanced production of alkaline protease under batch and packed bed fermentation conditions. *The Internet Journal of Microbiology*. Vol 7 (2): 1-6.

Leboffe, Michael J. and Burton E. Pierce. 2010. *Microbiology Laboratory Theory and Aplication Third Edition*. Morton Publishing Company. America.

Lorío, L.U., L.B. Guillén, W.H. Ascencio, R.M. Amador, G. González, C.J.R. Umaña, B. Diez, and C.P. Alió. 2019. The influence of temperature and pH on bacterial community composition of microbial mats in hot springs from Costa Rica. *MicrobiologyOpen*. Vol 8 (1): 1-26.

Madhavi, Jatavathu, Srilakshmi, Jatavathu, K.R.S. Rao, Sambasiva, and M.V. Rao, and Raghavendra. 2011. Efficient Leather Dehairing by Bacterial Thermostable Protease. *International Journal of Bio-Science and Bio-Technology*. Vol 3 (4): 11-26.

Mamo, J., and F. Assefa. 2018. The Role of Microbial Aspartic Protease Enzyme in Food and Beverage Industries. *Journal of Food Quality*. Vol 2018: 1-15.

Martins, M.L.L, A.B.S. Delatorre, and R. Camila. 2007. Effect of culture conditions on the production of extracellular protease by thermophilic *Bacillus* sp. and some properties of the enzymatic activity. *Brazilian Journal of Microbiology*. Vol 38: 253-258.

Maunghan, H., and G.V. der Auwera. 2011. *Bacillus* taxonomy in the genomic era finds phenotypes to be essential though often misleading. *Infection, Genetics and Evolution*. Vol 11: 789-797.

Mazar, F.M., H.S. Mohammadi, E.M. Rad, A. Gregorian, and E. Omidinia. 2012. Isolation, Purification and Characterization of a Thermophilic Alkaline Protease from *Bacillus subtilis* BP-36. *Journal of Sciences, Islamic Republic of Iran*. Vol 23 (1): 7-13.

McDonnell, G.E. 2017. *Antisepsis, Disinfection and Sterilization Type, Action, and Resistance.* Basking Ridge. New Jersey, USA

Mohan, C., K.D. Long, M. Mutneja. 2014. *An Introduction to Inhibitors and Their Biological Applications 1st Edition.* EMD Millipore is a division of Merck KGaA. Germany.

Muhtar, H.S.M., A. Nawas, and Sundus H. 2016. Industrial application and production sources of serine alkaline proteases: a review. *Journal of Bacteriology and Mycology*. Vol 3 (1): 191-194.

Oda K. 2012. New families of carboxyl peptidases: serine-carboxyl peptidases and glutamic peptidases. *Journal of Biochemistry*. Vol 151 (1): 13-25.

Olajuyigbe, F.M., and J.O. Ajele. 2008. Some properties of extracellular protease from *Bacillus licheniformis* lbbl-11 isolated from "iru", a traditionally fermented African locust bean condiment. *Global Journal Biotechnology Biochemistry*. Vol 3 (1): 42–46.

Otroshi, B., M. Anvari, and M. Shariarinour. 2014. Study on Activity and Stability of Proteases from *Bacillus* Sp. Produced by Submerged Fermentation. *International Journal of Advanced Biological and Biomedical Research*. Vol 2 (7): 2283-2287.

Padder, S.A., G.H. Dar, Z.A.Bhat, K.Verma, and A.B. Wani. 2017. Morphological metabolic and biochemical characterization of bacterial root endophytes associated with brown sarson (*Brassica rapa* L.). *Journal of Pharmacognosy and Phytochemistry*. Vol 6 (2): 226-232.

Padmapriya, B., T. Rajeswari, R. Nandita, and F. Raj. 2012. Production and Purification of Alkaline Serine Protease from Marine *Bacillus* Species and Its Application in Detergent Industry. *European Journal of Applied Sciences*. Vol 4 (1): 21-26

Panda, M.K., M.K. Sahu, and K. Tayung. 2013. Isolation and characterization of a thermophilic Bacillus sp. with protease activity isolated from hot spring of Tarabalo, Odisha, India. *Iranian Journal of Microbiology*. Vol 5 (2): 159-165.

Pérez-Rodríguez, I., J. Ricci, J.W. Voordeckers, V. Starovoytov, and C. Vetriani. 2010. *Nautilia nitratireducens* sp. nov., a thermophilic, anaerobic, chemosynthetic, nitrate-ammonifying bacterium isolated from a deep-sea hydrothermal vent *Journal of Systematic and Evolutionary Microbiology.* Vol 60: 1182–1186.

Pertiwiningrum, A., F.D. Anggraini, N.A. Fitriano, and Rochijan. 2017. Isolation and identification of bacterial protease enzyme of leather waste. *Journal of the Indonesian Tropical Animal Agriculture*. Vol 42 (1): 33-41.

Pisano, M.B., M. Deplano, M.E. Fadda, and S.Cosentino. 2019. Microbiota of Sardinian Goat's Milk and Preliminary Characterization of Prevalent LAB Species for Starter or Adjunct Cultures Development. *BioMed Research Internasional.* Vol 2019: 1-7.

Podosokorskaya, O.A., I.V. Kublanov, A.L. Reysenbach, T.V. Kolganova, and E.A. Bonch-Osmolovskaya. 2011. *Thermosipho affectus* sp. nov., a thermophilic, anaerobic, cellulolytic bacterium isolated from a Mid-Atlantic Ridge hydrothermal vent. *Journal of Systematic and Evolutionary Microbiology.* 61: 1160–1164.

Prabhavathy, G., M. Rajasekara, Pandian and B. Senthilkumar. 2013. Identification of industrially important alkaline protease producing *Bacillus subtilis* by 16s rRNA sequence analysis and its applications. *International Journal of Research in Pharmaceutical and Biomedical Sciences.* Vol 4: 332-338.

Puntambekar, A.N., and M.S. Dake. 2017. Isolation, Purification, And Optimization Of Thermophilic And Alkaliphilc Protease Originating From Hot Water Spring Bacteria. *Asian Journal of Pharmaceutical and Clinical Research*. Vol 10 (9): 284-291.

Rahayu, D.W. 2019. Isolasi dan Penapisan Bakteri Proteo-Termofilik Dari Sumber Air Panas Geothermal Sipoholon-Tarutung, Sumatera Utara. *Skripsi*. Universitas Andalas Padang.

Rawat, N. And G.K. Joshi. 2018. Bacterial community structure analysis of a hot spring soil by next generation sequencing of ribosomal RNA. *Genomics*. Vol 111 (5): 1053-1058

Ren, S., F. Tomita, A. Yokota, and K. Asano. 2004. Isolation of a Cadmium-releasing Bacterium and Characterization of Its Novel Protease. *Journal Bioscience, Biotechnology, and Biochemistry*. Vol 68 (8): 1627-1633.

Rigoldi, F., S. Donini, A. Redaelli, E. Parisini, and A. Gautieri. 2018. Engineering of Thermostable Enzymes for Industrial Applications. *APL bioengineering*. 2 (1): 11501.

Runtuboi, D.Y.P., T. Gunaedi, M. Simonapendi, dan N.N.L. Pakpahan. 2018. Isolasi dan Identifikasi Bakteri Termofilik dari Sumber Air Panas di Moso Distrik Muara Tami Kota Jayapura Provinsi Papua. *Jurnal Biologi Papua*. Vol 10 (2): 68-73.

Saeki, K., K. ozaki. T. Kobayashi, and S. Ito. 2007. Detergent Alkali Proteases: Enzymatic Properties, Genes, and Crystal Structures, *Journal of Bioscience and Bioengineering*, 103 (6): 501-508.

Samad, N., S.A.A. Azura, D.N. Jimat, and N.A.A. Shukor. 2017. Isolation And Identification Of Halophilic Bacteria Producing Halotolerant Protease. *Science Heritage Journal.* Vol 1 (1): 7-9.

Setyorini, E. S. Takenaka, S. Murakami, and K. Aoki. 2006. Purification and characterization of two novel halotolerant extracellular proteases from *Bacillus subtilis* strain FP-133. *Journal Bioscience, Biotechnology, and Biochemistry.* Vol 70 (2): 433–440.

Shankar, S., S.V. More, and L.R. Seeta. 2010. Recovery of silver from waste x-ray film by alkaline protease from *Conidiobolus coronatus*. *Kathmandu University Journal of Science, Engineering and Technology*. Vol 6: 60-69.

Sharp, C., A. Martínez-Lorenzo, A, Brady, S. Grasby, and P. Dunfield. 2014. Methanotrophic bacteria in warm geothermal spring sediments identified using stable-isotope probing. *FEMS Microbiology Ecology.* Vol 90 (1): 92–102.

Shuai, W., L. Xuezheng, Z. Li, and D.S. Zilda. 2012. Screening and Characterization of the Alkaline Protease Isolated from PLI-1, a Strain of *Brevibacillus* sp. Collected from Indonesia's Hot Springs. *Journal of Ocean University of China.* Vol 11 (2): 213-218.

Shuang, L., X. Yang, M. Zhu, and X., Wang. 2012. Technology Prospecting on Enzymes: Application, Marketing and Engineering. *Computational and Structural Biotechnology Journal*. Vol 2 (3): 1-10.

Singh, G., A. Bhalla, P. Kaur, N. Capalash, and P. Sharma. 2011. Laccase from prokaryotes: A new source for an old enzyme. *Reviews in Environmental Science and Biotechnology*. Vol 10 (4): 309–326.

Stetter, K. O. 2006. History of discovery of the first hyperthermophiles. *Extremophiles*. Vol 10 (5): 357–362.

Susanti, E. 2002. Isolasi dan karakterisasi Protease dari *Bacillus subtilis* 1012M15. *Biodiversitas*. Vol 4: 12–17.

Takai K., K. Nakamura, T. Toki, U. Tsunogai, M. Miyazaki, J. Miyazaki, H. Hirayama, S. Nakagawa, T. Nunoura, and K. Horikoshi. 2008. Cell proliferation at 122°C and isotopically heavy CH4 production by a

hyperthermophilic methanogen under high-pressure cultivation. *Proceedings of the National Academy of Sciences.* Vol 105 (31): 10949–10954.

Tarik A., M. Ouadghiri, M. Melloul, and J. Swings. 2015. Thermophilic bacteria in Moroccan hot springs, saltmarshes and desert soils. *Brazilian Journal of Microbiology*. Vol. 46 (2): 443–453.

Urbieta, M. S., E.R. Donati, K.G. Chan, S. Shahar, L.L Sin. and K.M. Goh. 2015. Thermophiles in The Genomic Era: Biodiversity, Science, and Applications. *Biotechnology Advances*. Vol 33 (6): 633–647.

Vadlamani, S. and S.R. Parcha. 2011. Studies on industrially important alkaline protease production from locally isolated superior microbial strain from soil microorganisms. *International Journal of Biotechnological Applications*. Vol 3:102-105.

Vieille, C., and G.J. Zeikus, 2001. Hyperthermophilic Enzymes: Course, Uses & Molecular mecanisms of Thermostability. *Microbiology and Molecular Biology Reviews*. Vol 65 (1): 1-43.

Wahyuna, D., A. Agustien, dan Periadnadi. 2012. Isolasi Dan Karakterisasi Bakteri Termo-Proteolitik Sumber Air Panas Sungai Medang, Sungai Penuh, Jambi. *Jurnal Biologi Universitas Andalas.* Vol 1 (2): 93-98.

Younes, G., R. Sara, E. Alireza, K. Aboozar, S. Maryam, S. and T. Najme. 2011. Screening and isolation of extracellular protease producing bacteria from the Maharloo salt Lake. *Iranian Journal of Pharmaceutical Sciences.* Vol 7:175-180.

Yuanita, D.N.S.P., dan P.R. Wikandari. 2014. Screening Bakteri Proteolitik Termofilik Dari Sumber Air Panas Singgahan Tuban. *UNESA Journal of Chemistry*. Vol 3 (3): 49-54.